In vitro biotransformation of ochratoxin A using a co-culture system with Caco-2 and HepG2 cells

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Introduction

Ochratoxin A (OTA) is a mycotoxin produced by several species of the Aspergillus and Penicillium genera. OTA occurrence has been worldwide reported in food and feed products derived from cereals, as well as in other foodstuffs as beer, dried fruits and spices. OTA exhibits toxicological properties such as cytotoxicity, genotoxicity, immunotoxicity, and generates oxidative stress.

Objective

The aim of this study was to assess the cytotoxicity, permeability and OTA biotransformation in a transwell system using Caco-2 and HepG2 to mimic the passage through the intestine and the hepatic metabolism.

Materials and methods

OTA concentrations assayed were 5, 15 and 45 µM for 3 h. MTS assay showed that OTA did not induce cytotoxicity either to Caco-2 orHepG2cells. UPLC/MS–MS was used for the detection and confirmation of OTA and its metabolites in cell culture medium from the apical and basolateral chambers of the system.

Results

After 3 h of exposure, OTA concentration decreased in the apical chamber, 39.3% 53.3% and 46.5% respectively, regarding the initial concentrations. Low OTA concentrations were detected in all samples, while the metabolites identified were the ochratoxin B and OTA methyl ester.

Conclusion

The standardized protocol used allows us to perform a co-culture using Caco-2 and HepG2 cells to carry out an evaluation of the in vitro OTA biotransformation, by this way we have observed a profile of metabolites different from other studies.

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